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Conventional methods are inadequate for teaching deaf people, especially at college level. In order to determine whether television would be more effective, several factors needed to be investigated. Priority was given to the design of the instructional program. A multisensory method (the simultaneous method) was adopted. Tests showed that the program should have a determined pace rather than one that was individual. Sixteen-millimeter films were used, because video tape recorders are not standerized. Special standards were evolved for selecting the television instructor and interpreter. Tests were made to determine what kind of visual and tape formats to use. Regular films proved more effective in teaching than slow-motion films. The finished product, a 16mm television film on child psychology was found to be useful for instructing deaf people, although several modifications were suggested. There are recommendations for future research, and the research methods are fully documented and illustrated. (GO)

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FINAL REPORT

Project No. 6-8194
Grant No. OEG-3-6-068194-1565

A STUDY OF THE FEASIBILITY OF USING TELEVISION TO TEACH CHILD PSYCHOLOGY TO THE ACOUSTICALLY HANDICAPPED

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The research reported herein was performed pursuant to a grant with the Office of Education, U.S. Department of Health, Education and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

U. S. DEPARTMENT OF
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I. ACKNOWLEDGMENTS

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The project director wishes to express his gratitude to the many persons who participated in this project, including

George Wells, Ph. D., Professor of Psychology, Kansas State College at Pittsburg--who served as the psychology instructor during the first phase of the project and as consultant throughout the study;

John N. Marr, Ph. D., Associate Professor of Psychology, University of Arkansas--who was the television instructor for the final video tape;

Dr. Stanley D. Roth, Superintendent, Kansas School for the Deaf at Olathe--who served as consultant and identified the problem area;

Roy G. Parks, Superintendent, Arkansas School for the Deaf, Little Rock--who interpreted the final video tape of the psychology unit;

Lloyd Parks, Principal, Kansas School for the Deaf at Olathe--who was an evaluation consultant;

Richard Bowles, Pittsburg, Kansas--who was the interpreter for the three exploratory video tapes;

Dr. Powrie V. Doctor, Gallaudet College, Washington, D. C.--for his willingness and spirit of cooperation;

Gary D. Blake, Consultant, Research and Demonstration Project with Multiply Handicapped Deaf Adults, Hot Springs, Arkansas--whose evaluation of and comments on the final film were most helpful.

II. SUMMARY

The purpose of this project was to determine the feasibility of using television to teach child psychology to the accoustically handicapped.

Traditional local efforts to expand the post-secondary educational opportunites of the acoustically handicapped had not been too successful for the following reasons:

1. Instructors were unaccustomed to teaching the deaf;
2. Instructors relied on straight, lecture-discussion techniques;
3. Deaf students were in classes with normally-hearing students.

Therefore it was decided to produce on video tape a segment of a course in child psychology dealing with prenatal development. This particular course was chosen as it was found to be typical of the kinds of courses taught by extension and correspondence to acoustically-handicapped groups. To facilitate comprehension of deaf students, the format of the tape included both an instructor and an interpreter who were carefully selected on the basis of previously outlined criteria.

Since use of video tape proved unsatisfactory because of the lack of standardization of television systems among institutions, the 33-minute segment was dubbed on 16 mm. film for distribution and evaluation.

Selected evaluators reviewed the final production of the film. It was their consensus that the film is effective, and that it is feasible to use television to teach child psychology to the acoustically handicapped.

III. INTRODUCTION

A. THE PURPOSE OF THIS PROJECT was to determine the feasibility of programming a college-level child psychology course for the acoustically handicapped.

B. Need for the Study.

There is a need for studies designed to improve the education of the deaf. As emphasized in a report from the National Conference on Education of the Deaf, our responsibility in the education of the deaf is the same as it is for all our youth: to assist them in developing their talents fully, to prepare them to be responsible citizens and to offer them a stimulus and opportunity for cultural enrichment of their lives.

> Adult education of the deaf should be a flexible program of continuing education at all levels of intellectual ability. It should involve both the learning of new knowledge and skills and the retraining and improvement of existing skills. (129)

This project is specifically focused on the problem of improvement of education of the deaf at the post-high school or college level. The specific problem was identified by the Advisory Committee on the Education of the Deaf when it stated

> Post-secondary education opportunities for the young people are extremely limited. The deaf student should have full access to a full range of post-secondary occupational and adult education available to the general population and be prepared to benefit thereby. (xvii)

The problem is magnified by the fact that the changing occupational outlook will require more education which must result in an expanded curriculum. The deaf student will be required to take a higher level

of courses. As a partial solution to the problem, the Advisory Committee recommended that there be developed a program of integrated classes with the hearing students. However, it was pointed out that there would be great difficulty in relating a given program to the different types of deaf persons. Self-instructional systems using the television medium might be a practical solution.

The need for expanded curriculum for students is being experienced at the Kansas State School for the Deaf at Olathe, Kansas. Deaf students were enrolled in an extension course conducted by the Psychology Department at Kansas State College. Lectures were presented by an instructor and were interpreted by a faculty member of the School for the Deaf. As professors teaching the course were unaccustomed to teaching deaf students and as little attempt was made to deviate from the straight lecture-demonstration procedure, the handicapped students were at an obvious disadvantage.

In 1966 the Advisory Committee indicated that the unsatisfactory state of education of the deaf lies in our failure to launch an aggressive assault on some of the basic problems of language-learning of the deaf through experience or through well-planned and adequately-supported research, and in the failure to develop more systematic and adequate programs for educating the deaf at all levels. There is a need to develop a more cooperative spirit between institutions of higher learning and schools of the deaf, resulting in better understanding of the communications problems of teaching the deaf.

There is also a need to direct the efforts of learning resource centers at institutions of higher learning to help program accredited

television courses. Courses using single-concept films or programmed texts should be developed around the curriculum of institutions of higher learning. These courses then could be accredited and made available to deaf students through correspondence or extension.

There is a need for research in the application of instructional technology, a need to insure progress. Experimentation in the development of a television programming system utilizing a multi-media approach to learning would be a step in the right direction. It is hoped that this project will help develop the guidelines to determine the feasibility of such an endeavor.

C. Related Literature

One prerequisite for providing meaningful television programming for the acoustically handicapped is to be knowledgeable about how the unique needs of the deaf have been approached effectively in the past.

The teacher has several sensory channels available for use in teaching the deaf. Of significance are the visual, the auditory, the tactile, and the kinesthetic. In our study we were primarily concerned with the visual and auditory. Hudgins (1953a) has shown that however poor the child's hearing may be, what hearing ability he does have may be developed to supplement vision in visual-auditory presentation. In other words, the eye and the ear together perceive speech better than either one alone; and hence the bisensory approach is likely to produce better speech and better understanding.

Keeping this factor in mind, the investigator became aware of three basic areas pertinent to the project: First, research related to the simultaneous method for instructing the deaf; second, characteristics needed by the interpreter to translate the spoken word into sign language; and third, the effectiveness of the television medium for presenting programmed course work for the deaf.

In reference to the first point of interest, Garreston (Doctor, 1963) has written that greater understanding with greater facility is the credo of the simultaneous method as expressed by Dr. Leonard M. Elstad, president of Gallaudet College. The simultaneous method is attracting the interest of educators, both in America and in Europe, as a dynamic and concentrated approach to the

communications problems of the deaf. It means simply the simultaneous use of speech, lipreading, hearing aids, fingerspelling and the language of signs in conversing with the deaf. Essentially a means of communication, this system presupposes a background on the part of the student with the oral, manual or auricular method, or any combination of the three. The college professor, teacher, parent or other user of the simultaneous method is not concerned with teaching the mechanics or fundamentals of oralism or manualism, but rather with getting in or out of the classroom. It is presently being used widely on the upper elementary and high school levels where the instructional process is accelerated. It is also the recognized method at Gallaudet College where students come from varied backgrounds and thus benefit individually from the portion of the simultaneous method which falls within their scope of understanding.

The person using the simultaneous method speaks, fingerspells and signs every word in logical and correct English word order. The deaf person usually watches the speaker's lips and, as he invariably meets words which are not readily grasped from the lips, his eyes scoop them up from the accompanying fingerspelling and signs. Thus there is no artificial slowing down, no recourse to pad and pencil or blackboard, no need of constant repetition, and the liklihood of misunderstanding is greatly minimized if not entirely eliminated.

Such a method need not detract from the development of speech. Rather, it serves as an adjunct to such development, and deaf adults have frequently commented that it appears to build up their lipreading ability. Group or individual hearing aids may also be utilized within

the framework of this method so that the hard-of-hearing person gains increasing confidence as he goes along.

Benson (Doctor, 1963) stated that interpreting or translating spoken words into the language of signs is not an easily acquired art, but as with all arts, can be mastered only by long and diligent application.

In discussing the second interest area, we find that the interpreter must possess several basic aptitudes if he wishes to achieve effective communication and good interpretation.

1. An adequate vocabulary on the part of the interpreter. He must not translate every word spoken, but should give as accurate a translation as possible, remembering that as an interpreter his duty is not to inform the audience of what he thinks the speaker is saying, but to allow the audience to draw its own conclusions.

2. Skill in quick thinking. The interpreter may have to change a phrase or a word here and there without changing the meaning. There are single signs that carry several different meanings, as well as single words that have several different signs. For example, there is just one sign for the words "earnest," "zealous," "industrious," "enthusiastic," "Methodist." Also there is but one sign for "interrupt," "interfere," "obstruct" and "hinder." There are different signs for the word "run" depending entirely on the meaning intended. Does the speaker mean "run" as opposed to "walk"? We say the river "runs"; the man "runs" for office; a "run" on the bank.

3. The ability to convey facial expressions and, by the emphasis used in the execution of the signs, the feeling and mood of the speaker, whether it be a note of sadness, happiness, anger, humor or bewilderment. Upon the interpreter rests the responsibility of conveying to the eyes of the deaf that which the modulation of the voice of the speaker carries to the ears of the hearing.

4. The ability to react to the audience. A good interpreter will study his audience and will quickly be able to see if the group is grasping his translation. He may at times elaborate upon certain points without the knowledge of the speaker.

5. The ability to relax. The interpreter must be at ease, not only in the execution of the signs, making them with spirit, grace and fluency, but also in his stance. If he is tense, this feeling of tenseness or uncertainty will carry over to the group who will feel that the interpreter is not qualified for the responsibility that rests upon him.

The last point to be considered concerns the effectiveness of the television medium. Studies conducted in the area of instruction by television have generally indicated its effectiveness.

There is the actual design of the programs themselves to be considered. The March, 1965, "Bulletin of Programmed Instruction" from Columbia University is devoted entirely to the use of radio and television in programmed instruction, with the emphasis on the combination of television and teacher instruction.

Robert D. Smith points out the need to apply learning theory to the production of instructional programs for use on film and television. It is pointed out that the current emphasis in production is upon the careful design of the instructional program. It is important in designing a program of this type to be aware of the research in the area of human learning in order to take full advantage of the learning process, as well as the recommendations resulting from the instructional television research.

In the same bulletin, P. Kenneth Komoski reports on a project at the Institute of Educational Technology concerned with creating

"empirically validated instructional television." Each program must be tested and re-tested to insure that the programs teach what they have been designed to teach.

A study by George L. Gropper and Gerald C. Kress concerns the problem of pacing programming in order to insure the goals of high educational achievement and instructional efficiency. In research conducted at the American Institute for Research and Metropolitan Pittsburg Educational Television, the authors found that students, if given freedom, do not always adopt the best pace for their individual needs. A consistently fast pace may lead to high error rates, and consequently lower achievement; while a consistently slow pace is not compatible with the goal of instructional efficiency.

Their finding suggested that self-pacing can be non-adaptive and that in some cases instruction can be more effective when it is fixed-paced rather than self-paced. The best evaluation comes from tests which will indicate how effective and efficient learning has been.

VanderMeer (1951) asserts that the results of his research indicate that students improve in their ability to learn from films as they have increased experience in training through films. The instructor planning to use film can learn five things from this study.

1. Unguided practice in viewing films results in improvement to learn from films.

2. When films are used as a fill-in or as entertainment, the student is permitted to develop habits of a passive observer rather than those of an active, participating learner. Instructors should emphasize that films are made to present information for the students

to learn and that the students should try to learn as much as possible from the film.

3. Emphasis on the training value of films can be made by announcing that the film will be the primary means of covering the content or that tests are to follow the film showing.

4. Film utilization procedures should include time for reviewing those parts of the film that are not understood; however, care should be taken not to repeat content that is already clearly understood. Repetition may result in boredom and lack of attention to future film showings.

5. Avoid note-taking.

This research has some direct bearing on the use of televised courses for the deaf. For example, the next step would be the establishment of a methodology for instruction to improve learning from films or television.

D. Objectives

The feasibility investigation was designed to provide the guidelines for the eventual production of a television course to instruct acoustically-handicapped students. Using a child psychology course at the Kansas School for the Deaf as the vehicle for the probe, the pilot program established the most effective method of communicating with the deaf. The multi-sensory approach was utilized, taking advantage of sign language, lipreading and demonstration. It is expected that the techniques found to be best suited to communicate with the deaf in the project can provide insight for further studies in the area of programming information for the acoustically handicapped. In addition it is hoped that through this feasibility study a comprehensive psychology course using the television medium can be developed if the money is available.

The specific objectives of the study were

1. To study the various television techniques that are applicable to the teaching of the acoustically handicapped, using the sign language, body movements and facial expressions;

2. To explore the possibilities of developing a general framework in which to produce a wide variety of useful techniques for the acoustically handicapped;

3. To structure a basis for intelligent selection of course content that could be communicated using the television medium;

4. To develop an awareness of the potential use of sign language via television to teach child psychology to the acoustically handicapped;

5. To determine the feasibility of programming a television course for the deaf.

E. Limitations of the Study

The limitations of the study included

1. Measurement--Measurement techniques must be developed and selected which are appropriate for the intended objectives.

2. Field Testing--More extensive field testing of the television units should be made.

3. Equipment--Lack of standardization of video recorders limited the field testing of the first three video tapes.

IV. METHODS

A. Background

The feasibility study was a cooperative project of the Kansas School for the Deaf, Olathe, Kansas, and Kansas State College, Pittsburg, Kansas. The study was later transferred to the University of Arkansas for completion. The Psychology Department at Kansas State College was directed, through the Extension Department, to teach a series of integrated accredited psychology courses at the School for the Deaf. Approximately 50 percent of the class was totally deaf and the remainder of the group had impaired hearing. The visiting instructors were not accustomed to teaching deaf students; therefore, teacher-pupil communication was seriously handicapped. It was extremely difficult to use a multi-sensory approach, to take advantage of sign language, lip movement, slides, motion pictures and demonstrations. Consequently, the visiting instructors were dependent solely upon the interpreter's ability to communicate through signing and lipreading.

The possibility of using the television medium was suggested and a planning session was arranged between the Department of Educational Technology, the Psychology Department, and the faculty of the Kansas School for the Deaf. The following procedural outline was suggested as a result of this planning session:

1. Establish objectives;
2. Determine the course content to be presented;
3. Visit Gallaudet College;
4. Determine the visual format for the presentation;
5. Develop guidelines for the selection of an interpreter and a television instructor;
6. Produce the video tape.

B. Content of the Child Psychology Course

The child psychology course is an offering of the Kansas State College at Pittsburg. It was selected as being typical of the type of courses taught by the faculty of the College at the Kansas School for the Deaf. The original outline and content were supplied by the Psychology Department. The psychology courses were taught in a content-centered manner. The project director did not dictate the course content; however, he reserved the right to adapt the course content for television presentation. Therefore, the unit was modified into the formal script form (See Appendix C).

As taught on campus, Child Psychology is a lecture-discussion course that meets for three one-hour periods per week during a semester. When it is requested in sufficient numbers, the course is also taught on extension by a faculty member of Kansas State College. For example, Child Psychology and similar courses are requested by the Kansas School

for the Deaf. This psychology course is concerned with the accurate description, explanation and prediction of behavior. It is described in the Kansas State College catalogue as follows:

> The principles of growth and development for prenatal periods to adolescence. Special consideration to topics of maturation, learning, emotional, social and physical development of the child.

It was found that the content of the child psychology course taught at the University of Arkansas is similar to the one taught in Kansas.

C. Visit to Gallaudet College

The next step in the project was to visit Gallaudet College to discuss the objectives of the study. At this conference it was suggested that one of the most important qualities of the television interpreter is that of spontaneous invention. He should have the ability to instinctively invent and develop symbols that will effectively communicate the lecturer's message to the audience. It is also important that the interpreter be aware of an aesthetic beauty that the signs should have. In addition, it is imperative that his pacing be rhythmic and consistent. Research in the development of new signs and symbols in psychology was also discussed.

D. Video Tapes Produced

Four units of the course were selected for television programming. The three initial units were used to establish the visual format and were developed at Kansas State College with Dr. George Wells as instructor and Richard Bowles as interpreter. The final video tape which is a 33-minute program is entitled PRENATAL DEVELOPMENT.

Three 25-minute video tapes were made on a helical scan video recorder. In addition, one 20-minute 16 mm. film was made of the interpreter signing the introductory unit in psychology. The purpose of the film was to determine if an increase or decrease in the signing speed would have an effect on comprehension.

The final tape was dubbed on 16 mm. film for distribution and review at the Kansas School for the Deaf and the Arkansas School for the Deaf. This dubbing was necessary because of the incompatibility of the schools' video tape recorders.

E. Criteria for Selecting the Television Interpreter (adapted from Benson)

1. The television interpreter should have an adequate vocabulary and the ability to coordinate his facial expressions with the phrases that are being signed. It is essential that the personality of the interpreter be projected to the audience through the camera.

2. He should be as familiar with the material being used on the television program as time permits. However, skill in quick thinking is necessary as on occasion it may be necessary to change a word or a phrase without changing the meaning of the narrative.

3. The interpreter must have the ability to convey by facial expressions and by the emphasis used in the execution of signs the feeling and mood of the instructor.

4. It is most important that the interpreter study the needs of his television class.

5. He must be at ease and be able to make smooth transitions called for when switching from one concept to another.

6. It is advantageous for the interpreter to have attractive, graceful hands. During actual taping he should be certain that his hands remain within the general area for which they have been lighted.

7. The interpreter should constantly explore the possibility of developing a general framework in which to produce a wide variety of television techniques for the acoustically handicapped.

8. He should have an interest in the use of television and if possible some knowledge of the technical aspects of the medium.

9. It is essential that the television interpreter be a spontaneous innovator of new signs. Many psychological terms used in the program do not as yet have sign language equivalents.

F. Criteria for Selecting the Television Instructor

1. The television instructor must teach as if he were talking to one individual. As a result, television instruction becomes intimate and demands that the instructor have a warm, understanding personality. Stiffness and monotony must be avoided.

2. A background of teaching experience and mastery of successful methods of presenting ideas to people at all different levels of maturity are needed by the television instructor.

3. He should be enthusiastic about the material being taught.

4. A thorough knowledge of the subject is essential.

5. The instructor should possess creativity.

6. He should have well-organized work habits.

7. He must have the ability to work with others and to take criticism well.

8. He must be able to improvise, to "think well on his feet."

9. It is essential that the instructor be able to anticipate points of confusion.

10. The television instructor must have the ability to coordinate his speech with the signing of the interpreter.

11. He must understand the importance of pacing.

12. The instructor must realize that changing cadence, tone or speed can confuse the interpreter.

13. The instructor should have the time to go over the material with the interpreter to be certain that the lesson is being signed and interpreted accurately.

14. It is advantageous for the instructor to have some knowledge of sign language.

15. If possible, the instructor should have a prominent and expressive mouth so that his lips may be easily read.

16. Both the television instructor and the interpreter must be willing to place themselves in the hands of the television station staff. They may express their ideas but these must be adjusted to conform with the limitations of space, equipment and the idiosyncrasies of the director and his staff.

G. Slow Motion Photography

The purpose of the 16 mm. motion picture sequence was to determine if a slower or a faster speed in signing would improve the comprehension of the material being signed. After reviewing the first two experimental tapes, it was found that many words had to be finger-spelled as symbols do not exist for numerous psychological terms. Four ten-minute sequences were made on 16 mm. film at the following speeds: 16 frames per second, 24 frames per second, 32 frames per second and 64 frames per second. The interpreter was then asked to read his signs and then the notes were compared with the original script. It was found that his error rate was excessive when the film was run at a slower speed. The same test was given six months after the interpreter made the original film; the error rate remained at about the 50-percent level.

The 16 mm. film was taken to the Kansas School for the Deaf and was evaluated by the Superintendent and the faculty. It was their consensus that the signing could be interpreted more efficiently at the rate of 24 frames per second. Slowing down the motion did not prove to make interpretation easier. The trial speeds produced the following:

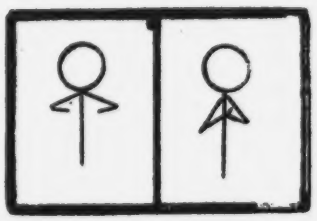
16 frames per second--increase speed of motion
24 frames per second--normal motion
32 frames per second--medium slow speed
64 frames per second--slow motion

The film insert of a slow-motion sequence on the video tape was discontinued and did not appear in the final tape.

H. Development of Visual Format--Special Effects

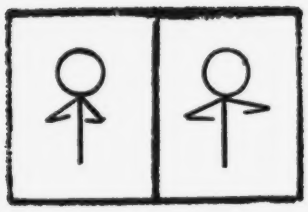
The purpose of this phase of the project was to develop a functional visual screen format so that a multi-sensory approach could be utilized. Through the use of a special effects generator, images on the television screen were varied in four ways.

(1)



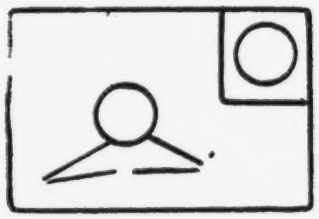
This first variation is a split-screen technique in which the screen was equally divided with the lecturer on the left and the interpreter on the right. Both subjects were in a standing position. Further variations as to size of the image were made within this format.

(2)



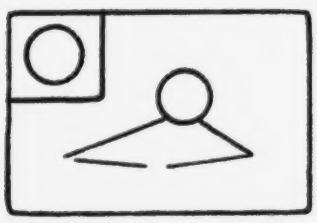
A split screen with the subjects in reverse position was tried. The screen was equally divided; however, the interpreter was on the left and the instructor on the right.

(3)



The interpreter was placed in the center of the screen and the lecturer in the upper-right-hand corner.

(4)



The interpreter was centered and the lecturer was in the upper-left-hand corner.

I. Camera and Studio Procedures

The height of the camera in relation to the subject was critical in this project as the emphasis was on a small area--the lip movement of the instructor and the hand movements of the interpreter. Inasmuch as the optical system of the television camera is

so designed that it emphasizes the plane or point opposite the lens, it was necessary to have the camera opposite, or the same height as the instructor's lips. By this method, this important point was emphasized on the television screen. The camera should be as high as the object it is emphasizing; for example, the camera that was focused on the interpreter was the same height as his hands.

The long focal length of the lens used to televise the interpreter resulted in the hands being in critical focus and the face being slightly out of focus. This added emphasis on the hand movements made them stand out clearly.

Lighting must also be considered. The hands of the interpreter were highlighted and had a greater brilliance factor than the face. The television instructor was lighted so that his mouth was emphasized. Front lighting was used in the final project; this put a slight shadow under the lips, giving them greater emphasis. The 16 mm. print of the final project illustrates this point well.

J. Evaluation of Tape Format

The examining group which evaluated the tape format was comprised of two consultants who were competent in both lipreading and signing, the psychology instructor and the project director. All members of the group agreed that the fourth format tested was the most desirable and would meet the objectives of the study. This decision was justified by the belief that the student would first attempt to lipread and, if difficulty was experienced, his eye pattern would follow naturally from a left to right position; thus, he would observe

the interpreter signing the information. Through this method, the multi-sensory approach was used to its fullest advantage. It was also noted by the evaluation group that it is desirable for the head size of the interpreter and the instructor to be approximately the same size when projected on the screen.

K. Selection of the Interpreter and the Television Instructor for the Final Video Tape

The criteria previously outlined for selecting a television interpreter and a television instructor for the acoustically handicapped were used to select the participants in the final tape. Special attention was given to the ability of the interpreter to exercise spontaneous inventiveness in the development of new communicative signs. This was necessary because of the technical nature of the subject matter and the possibility that excessive fingerspelling would be used if spontaneous signs did not evolve.

The interpreter, Roy Parks, has had experience on educational and commercial television in signing the current news broadcasts. In addition to his daily television duties, he is also director of the Arkansas School for the Deaf at Little Rock.

The psychologist selected to serve as the television instructor was Dr. John N. Marr, Associate Professor of Psychology at the University of Arkansas. His outstanding attribute was the ability to maintain a consistent cadence, a pleasant tone, and a rate of speed that was constant and would not confuse the interpreter. Dr. Marr recognized the importance of pacing and his lip movements could be easily read.

All of these factors, in the opinion of the investigator, contributed to the selection of Dr. Marr for the task.

L. Development of a Script

A television script was written and the integration of slides, models and live action was planned.

M. Equipment Used

Professional vidicon television equipment that meets E. I. A. and F. C. C. broadcast standards was used throughout the project. The total system was made up of a dual high resolution camera chain designed to produce a picture with 800 lines horizontal at the picture center and an average of 600 lines in all four corners.

The total television system is composed of the following:

Two camera chains with zoomar lens, remotely-controlled
Two camera controls
Sync generator
Special effects generator
Film chain and power supply
Quadruplex video recorder

The first three video tapes produced were made on a helical-scan recroder that used a one-inch tape. The tape was not compatible with other recorders; therefore, it was impossible to send tapes to the cooperating institutions for evaluation. The manufacturer discontinued the model and they are now out of production. This experience necessitated the use of a more standardized video recorder such as a commercial quadruplex system. The final 33-minute PRENATAL DEVELOPMENT was recorded on such a system.

The recent development in the improved picture quality of kinescopes dubbed from video tape has opened new possibilities in the production of television programming. Three or four years ago, kinescopes had a reputation for poor quality and were considered something to be avoided. They could be identified at a glance because of the lines, shutter bar and raster collapse.

In addition to these uncontrollable defects, there was also lack of resolution.[1]

One of the most noticeable improvements in kinescopes was the elimination of the shutter bar effect.[2] A further refinement has been in the apparent sharpness of the image, for which credit has been given to the technical progress made in the production of television equipment in general and in cameras in particular.

Moreover, the introduction of video tape recording has contributed to extend the quality of kinescopes. When made from a good video tape, the end product is well balanced; also, many corrections can be made in the video tape before it is kinescoped. Many commercial production labs are equipped to make high quality dubs from video tapes made on a quadruplex recorder.

This recent development has great implications for the distribution of television programs on a 16 mm. or 8 mm. format.

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[1] The ability of a film emulsion to distinguish fine detail.

[2] Shutter bar might be defined as a kinescoping defect giving the appearance of a bad film splice.

N. Evaluation

The evaluation of the television unit, PRENATAL DEVELOPMENT, was made by the faculties, staffs and selected students of the Kansas School for the Deaf, Arkansas School for the Deaf, and an outside evaluator from the Research and Demonstration Project with Multiply Handicapped Deaf Adults at Hot Springs, Arkansas.

V. FINDINGS AND ANALYSIS

A. Production Techniques

The most efficient method of distributing the television course is in the 16 mm. or 8 mm. film format and not in the form of video tape. The reasons for this are as follows:

1. There is a lack of compatibility among the different makes of video recorders;
2. There is no standardization of video tape recorders among schools of the deaf and institutions of higher learning;
3. Video tape recorders at this stage of development need frequent servicing;
4. The standard television screen size is a limitation for presenting information to the deaf;
5. A 16 mm. or 8 mm. format will allow for use in the program of a wide variety of projectors;
6. The recent development of high quality dubbing from video tape makes the use of kinescopes a practical reality.

B. Group Evaluation

The assessment of the final phase of the project was concerned with the evaluation of a 33-minute 16 mm. film that was dubbed from the video tape. The interpretation of the film was based on the main purpose

of the study which was to determine the feasibility of programming a college course in child psychology for the acoustically handicapped.

Two groups were selected to review the film: Dr. Roth, Superintendent of the Kansas School for the Deaf and Dr. Roy Parks, Superintendent of the Arkansas School for the Deaf, in addition to staff and selected students from the two schools.

An evaluation form was given to each group. The comments were compiled and a consensus is listed as follows:

1. Were the objectives of the film clearly stated to the group?

All members of the evaluating groups felt that the objectives of the unit were clearly stated to them.

2. In your opinion, how effective was the lesson planned for the level of the students?

The evaluation groups felt that the instructors were directing their efforts toward the less able student who could not lip-read accurately.[1] This was evidenced in the fact that there was more interpretation than translation of the concepts by the interpreter. In the opinion of the evaluators, the professional deaf person would like to have exact terms and not interpretations. If the film was oriented toward the well-educated, highly-verbal deaf person, the evaluators would have preferred more translation than interpretation; more fingerspelling of terms; and that the signing be reserved for

---

[1]In most cases, the students enrolled in such college courses would be classified as well-educated, highly verbal. It is this level of development of verbal ability that should determine the visual format of the television unit.

those signs which have a universal meaning.[2]

3. Effectiveness of the Television Instructor

All the reviewers felt that the effectiveness of the television instructor could be improved: first, by reducing his rate of delivery and secondly, by looking directly into the camera.[3]

4. Effectiveness of the Interpreter

The interpreter was rated high by all the evaluators. It was his responsibility to interpret the information presented by the instructor and not to make a direct translation.

5. Do you feel that child psychology can be taught by television to the handicapped?

In all cases, the viewers thought that this area could be taught effectively on television.

6. List the most outstanding weakness of the television unit.

The most frequent weakness mentioned was concerned with the technical aspects of the film.

7. Teachers' suggestions pertaining to the utilization of the film

It was suggested that the utilization of the film would be more functional if it were broken up into small sequences of 10-15 minutes in length. These sequences could be used as a tool for a

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[2]A number of signs are now being added and standardized from the various disciplines, including psychology. The use of these new symbols would make a more accurate translation possible.

[3]The use of a teleprompter would have eliminated this problem; none was available when the sequence was made.

a correspondence course student or for a student who is enrolled in residence course work. The film could be used for review, particularly if the deaf person was enrolled in a college for normally-hearing students and had to depend upon lipreading and notes from other students to get thrcugh the courses. If he had at his disposal a number of courses on film, he could review them at his leisure. Moreover, the film units would be easier to handle if they were in shorter lengths.

The well-educated, highly-verbal deaf person would utilize the film differently than one who is not skilled in lipreading. The well-educated, highly verbal deaf person would concentrate on the lips, particularly if he realized that there was more interpretation than translation. He would also be able to see the signing and fingerspelling incidentally while he was watching the lips. This type of deaf person would be interested in the precise term that the instructor used in explaining concepts.

Consideration should be given to film utilization procedures.[4]

Representative comments written by the evaluators and students are listed as follows:

The presentation of the course content on television results in fewer distractions.

The interpreter signing was easier to follow because of the large screen projection.

---

[4]Research indicates that students improve in their ability to learn from films as they have increased experience in training through films. (VanderMeer, 1951)

The student could maintain eye-contact with the television instructor.

The film was reviewed by students who were enrolled in the extension at Kansas State College and they indicated that the television unit would result in more in-depth preparation by the instructors.

One of the disadvantages of a television course would be that there would be less interaction between the students and the instructor. The students could not participate in a class discussion. It was suggested that this could be overcome by allowing some part of the class period for small group discussion.[5]

Having the course on a 16 mm. film made it possible for large screen projection, thereby making lipreading more facile.

C. Outside Evaluation

In addition to the two groups from the schools for the deaf, an outside evaluator, Gary D. Blake, Consultant, Research and Demonstration Project with Multiply Handicapped Deaf Adults, Hot Springs, Arkansas, reviewed the film. His comments were as follows:

> I have observed the film PRENATAL INFLUENCE . . . for the acoustically handicapped. It appears to be a type of media which would be of great value to deaf persons who are enrolled in college courses either in residence or through correspondence studies.
>
> The combination of interpreter, superimposed speaker, captions and illustrative drawings and photos provide the deaf viewer with sufficient visual media for an understanding of the material presented.
>
> The film does need obvious technical improvement prior to commercial production and functional distribution; but even in its present state of development, the film does convince me of the usefulness of this type of media.

---

[5]This generalization does not apply to the film presented; it only applies to the programming of an entire course.

Recommendations

1. Of course, the film would be much more palatable if it were in color.
2. The interpreter might consider use of more translation rather than interpretation; in other words the use of more fingerspelling than signs which have numerous verbal interpretations.
3. Since the deaf viewer will have some difficulty taking notes while viewing the film, charts, photos or even a transcribed narration might accompany the film.
4. Consideration might be given to at least partial, if not full printouts of the speaker's narration on the frames along with the manual interpretation.
5. It would be helpful if a manual narration could be superimposed on the illustrative frames to explain to the viewer exactly what he should notice. Along with this, stationary or animated arrows would assist the viewer in observing and understanding the process or phenomenon being described.
6. The oral narration could be slowed somewhat more so that the interpreting or translating could be conducted at a more leisurely pace.

/s/ Gary D. Blake

It was the consensus of all the evaluators that it would be feasible to use television to teach child psychology to the acoustically handicapped. Dr. Parks, Dr. Marr, Dr. Wells and Dr. Roth expressed an interest in cooperating in such a project. Overall, the evaluators felt that the film is worthwhile.

The 16 mm. film was not intended to be a finished production for distribution. The treatment was experimental throughout and it should be assessed in terms of photographic quality, integration of visuals, and the visual format. The production is divided into several units which may be used independently for testing.

VI. CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

Conclusions

The development of television courses for the deaf may be one means of solving difficult problems in post-secondary opportunities for deaf people.

A course in child psychology can be successfully programmed for the deaf; however, the following production recommendations should be considered:

1. The interpreter and the television teacher should be selected in terms of the criteria developed on pages 16 and 17 of this report.

2. The length of the television unit should be approximately 15 minutes.

3. The visual format of the television presentation should involve both the lecturer and the interpreter with the necessary visuals and captions integrated logically.

4. The well-educated, highly verbal deaf student prefers to have the interpreter translate the information, rather than make an interpretation.

5. Large-screen projection of the television unit made lip-reading and the interpretation of signs more easily understandable.

6. Slowing down the action of the interpreter through slow motion photography did not improve the students' comprehension.

7. Television courses recorded on a quad-head recorder can be dubbed onto 16 mm. or 8 mm. film for distribution. This would reduce production costs and the final program could be distributed in the form of a film cartridge to be integrated into a self-instructional teaching system.

A closer cooperation needs to be developed between institutions of higher learning and schools of the deaf. If institutions of higher learning were aware of the problems of teaching the handicapped, they would willingly make a contribution in the development of accredited curriculum materials.

Recommendations for Future Research

The film PRENATAL DEVELOPMENT could be used to make the following studies:

Study No. 1

Purpose--To measure the overall effect of dependency upon signs and lipreading versus the dependency upon sound alone. This study could compare an acoustically-handicapped group with a normally-hearing group, equating the groups for socio-economic level and intelligence. The analysis of covariance could be used with controls on socio-economic level, intelligence, and possibly pre-test scores in the subject matter. In addition, a check could be made on interaction between the person's condition and level of intelligence.

Study No. 2

Purpose--To measure the overall comprehension of a group who cannot understand signs, who cannot hear the sound, but who could learn about prenatal development strictly from watching both the film and the overall movement of the interpreter. The procedure could be to present the film, from which the sound had been cut, to a normal auditory group, a handicapped group, and a normal group who had previously heard the film. A comparison of these three groups could be made by the analysis of covariance controlling both intelligence and pre-test measures of subject-matter achievement and assessment of socio-economic background.

Study No. 3

Purpose--To correlate the amount of information gained from the film with the amount of information gained from reading the text. The group's understanding of each part of the film could be measured by using a student response system: if at any particular moment the deaf student could not understand the interpreter or the instructor,

he could press a button, thus recording his response. Using this technique, empirical validation of all tapes could be made before they were distributed. The lecture and slide presentation could also be recorded separately from the interpreter's section. Thus the interpreter could dub in the sign language at a later time and, if an error were made, he could erase and correct any part of his interpretation.

A further recommendation would be for basic research in concept development. This kind of investigation could provide guidelines for more effective television visualization.

34 APPENDICES

35 APPENDIX A

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40 APPENDIX B

GLOSSARY OF TERMS

Aspect ratio: Proportional relationship of the width of the television picture to the height. In television the aspect ratio is four units wide by three units high. In movies the traditional ratio has been four by five, and if this deviation is not recognized, especially in film or kinescope shows, the resulting edge trim both top and bottom results in badly framed and incomplete television pictures.

Camera chain: A television camera connected to a control unit and viewing monitor.

Camera switching or mixing: Control room operation by technical director (TD) or video operator by which he switches camera signals on the air or mixes camera signals on the air by depressing controlling keys associated with the camera signals.

Closed-circuit television: The use of television, transmitted from cameras to receivers over cable, or by microwave, permitting private reception of programs only by those receivers included in the circuit.

Dubbing: Re-recording for the preparation of a master record.

Emulsion: Sensitive coating on films, plates and papers, composed of silver halide crystals suspended in gelatin.

Fade: A production term for a gradual transition in which the television picture gradually goes to or comes up from black(no picture).

Instructional television: Television used within the formal classroom context on any educational level.

Kine or kinescope: (1) Technique developed to record on film complete television programs; (2) Tube used in receivers or monitors on which the television picture is reproduced.

Resolving power: The ability of the emulsion to distinguish fine detail.

Scanning: In television, the process of analyzing or synthesizing successively according to a predetermined method the light values of picture elements constituting a picture area.

16 mm.: Film size currently being used for most film and kines in television.

Super: A video special effect in which two television signals are fed into a switcher-fader so that one is superimposed upon the other.

Video: The picture portion of a television presentation.

Video tape recording: The recording of both the picture and the sound of a television presentation by electronic impulses on a special magnetic recording tape which can be played back when desired.

Vidicon: A camera pickup tube of much smaller physical size than the image orthicon. It requires more light but is less expensive in cost and operation. The normal tube for instructional television, industrial and broadcast film applications.

Zoom lens: A variable-focal-length lens which, by simple mechanical adjustment without physical movement of the camera, can vary the field of view without losing the clarity of focus.

The following definitions were taken from EDUCATION FOR THE DEAF, A Report to the Secretary of Health, Education, and Welfare by his Advisory Committee on Education of the Deaf:

The deaf: Those children whose principal source of learning language and communication skills is mainly visual and whose loss of hearing, with or without amplification is so great that it is of little or no practical value in learning to understand verbal communication auditorially and whose loss of hearing was acquired pre-lingually.

The partially hearing: Those children whose loss of hearing is so severe as to require a special educational curriculum and program of training that involves full-time auditory training along with vision for developing language and communication skills.

The hard of hearing: Those children with moderate hearing losses, who are still able to understand readily fluent speech through hearing, whether or not amplification is used. Educationally speaking, these are children who, with some assistance, are able to attend classes with normally-hearing children.

43 APPENDIX C

UNIVERSITY OF ARKANSAS
CHILD PSYCHOLOGY SERIES
FOR THE ACOUSTICALLY HANDICAPPED

VIDEO:	AUDIO:
SLIDE 1: CREDITS	
SLIDE 2: CREDITS	
SLIDE 3: CREDITS	
	ANNCR:-The Center for Educational Technology of the University of Arkansas presents CHILD PSYCHOLOGY, a program designed for the acoustically handicapped to provide for more effective communication through sign language, lip reading and demonstration. (PAUSE) Dr. John N. Marr, psychologist, and Dr. Roy G. Parks, interpreter. (PAUSE) Dr. Marr:
	Since psychology is defined as the study of behavior of animal and man, in child psychology we will focus our attention on the child's behavior. We are interested in then in how he behaves and why he behaves in various ways. We will start the study of behavior at the beginning of life because we want to be there when behavior starts.
	Behavior begins in the uterus, so our study of the child begins before birth. We will follow his development in the uterus

VIDEO:

AUDIO:

through four stages: the period of the ovum, which lasts from conception to the end of the second week of life; the period of the embryo, which goes from the third week to the end of the second month; the period of the fetus, which lasts until birth; and finally, the birth process itself. During these periods there is tremendous growth in this new life.

SUPER 1: PERIOD OF THE OVUM

At the start we can only see the individual with the aid of a microscope, but at birth he will probably weigh as much as seven pounds or more. Although he may weigh twenty or thirty times that much as an adult, he has grown more prior to birth, because at birth he is over 10,000 times as heavy as he was at conception. He goes from one cell to millions of cells organized into the complex person we call a baby.

PART I

Let's start our examination of this new individual with a study of maturation, ovulation, and fertilization.

SUPER 4: MATURATION

First, the sex cells in the ovaries of the woman and in the testes of the man must mature. In both man and woman maturation begins when a sex cell divides into two cells. Each new cell has only half the number of chromosomes

VIDEO:	AUDIO:
	of the first or mother cell. Since the chromosomes carry the heredity of the new child, each parent is thus giving half of the child's potential heredity to him. The new cell of the mother becomes the egg or ovum, and the new cell of the father becomes what is known as the sperm.
SLIDE 4: SPERM (5 SECONDS)	As can be seen in this photograph, (PAUSE 5 SECONDS) the sperm grows a tail that is used to propel it toward the ovum. The egg continues to develop until it includes food material that will keep it alive after fertilization and until it enplants itself in the uterus. An ovum is realeased from the mother's ovary at least once a month: this stage is called ovulation. Between the age of about 13½ years until she is in her forties or early fifties, each woman ovulates once a month. It is believed that a woman's two ovaries take turns releasing these eggs until each ovary has released about 200 eggs during her lifetime.
SUPER 5: OVULATION	Following ovulation the ovum is pushed down the Fallopian tube by little hair-like cells in the tubes. During sexual intercourse millions of sperm are released in the woman's body and swim up toward the egg. If one meets
SUPER 6: FERTILIZATION	

VIDEO:	AUDIO:
SLIDE 5: FERTILIZATION	the egg in the Fallopian tube, fertilization takes place. (SLIGHT PAUSE) This slide shows some sperm approaching the ovum.
	Once fertilization has taken place, life is begun.
	As the fertilized egg moves further through the Fallopian tube, it begins to grow. The one cell becomes two, the two cells become four, the four cells become eight, the eight cells become sixteen, the sixteen cells become thirty-two and so it grows--as illustrated in these slides. (PAUSE)
(RAPIDLY) SLIDE 6: DIVISION OF THE CELL SLIDE 7: DIVISION OF THE CELL SLIDE 8: DIVISION OF THE CELL SLIDE 9: DIVISION OF THE CELL	In a few hours it is shaped like a ball and is made of many cells. The cells rearrange themselves and the ball of cells becomes hollow --much like a tennis ball. The ball of cells caves in and becomes cup-shaped. Next, they begin to divide themselves into layers. The innermost layer, the endoderm, will form the

VIDEO:

AUDIO:

intestines and other internal organs of the baby. The middle layer, or mesoderm, will form the bones, muscles, and blood. The outer layer, or ectoderm, will form the skin, nervous system and sense organs. This entire process is illustrated in this slide. (PAUSE)

SLIDE 10: ARRANGEMENT OF CELLS

When the fertilized ovum is about ten days old it attaches itself to the mother, as in this simulated sketch. (PAUSE)

SLIDE 11: ATTACHMENT TO MOTHER

It begins to take its food supply, its oxygen and have its waste eliminated via the mother's body. At this time the period of the ovum comes to an end and the period of the embryo begins.

But before we leave the ovum, let's look at the importance of these first two weeks. One reason is because heredity has been determined at this time. Of all the millions of different sperm swimming in the uterus, only one fertilizes that particular egg. A special set of chromosomes in the father combines with a special set of the mother's during this period to determine the inherent characteristics of the new individual--his height, weight, hair color, eye color, skin

VIDEO:	AUDIO:
	color, his activity, his intelligence, and perhaps part of his personality. Secondly, this period is important because of the danger to the new life. After fertilization he may not live if the ovum doesn't enplant itself in the uterus for nourishment and protection. And third, when the fertilized egg splits into two cells or four, the new cells may separate and thus, instead of having one new life, we have identical twins or possibly quadruplets.
PART II SUPER 2: PERIOD OF THE EMBRYO	The next stage of development, the embryo period, is also very important. It is this stage that we turn to next. The period of the embryo lasts between the stages of about fifteen days until approximately sixty days. During this period the embryo starts as a very very tiny individual. At the beginning he is about the size of a period on the end of a sentence on the page of a book. When he is sixty days of age he is almost an inch long. At the beginning of the period he still exists as just that round ball of cells that has a hollow center with three layers--ectoderm, mesoderm, and endoderm. But now, as this series of slides demonstrates, these layers begin to

VIDEO:	AUDIO:
	differentiate into each of the different organs. ⬇⬇⬇⬇⬇ (PAUSE FOR SLIDES)
SLIDE 12: DIFFERENTIATION INTO ORGANS	
SLIDE 13: DIFFERENTIATION INTO ORGANS	
SLIDE 14: DIFFERENTIATION INTO ORGANS	
SLIDE 15: DIFFERENTIATION INTO ORGANS	
SLIDE 16: DIFFERENTIATION INTO ORGANS	
	Thus, when 26 days old, the 1/8-inch long individual looks like this. ⬇ (PAUSE 5 SECONDS)
SLIDE 17: 4 WEEKS OF AGE	
SUPER 7: ECTODERM	As I said before, the ectoderm is going to become the skin and nervous tissue;
SUPER 8: MESODERM	the mesoderm is going to become the muscles
SUPER 9: ENDODERM	and blood vessels; and the endoderm is going to make up the inner organs of the stomach, esophagus, intestines, liver, and pancreas.
	The neural groove begins differentiating and very slowly but surely becomes the different parts of the brain. ⬇ (PAUSE)
SLIDE 18: NEURAL GROOVE	
	Limb buds are also beginning to appear. They will grow slowly, but by the end of the

VIDEO:

AUDIO:

of the sixty days there will be definite arms and legs. This series of slides illustrates the development of limb buds from the fourth to the sixth week. (PAUSE FOR SLIDES)

(5 SECONDS EACH)
SLIDE 19: DEVELOPMENT OF LIMBS- 4 WEEKS

SLIDE 20: DEVELOPMENT 5 WEEKS

SLIDE 21: DEVELOPMENT 5½ WEEKS

SLIDE 22: DEVELOPMENT 6 WEEKS

A tail, the back of which is visible in the slide, has appeared and will remain until the end of the sixty days when it will disappear into the rump. (PAUSE 5 SECONDS)

SLIDE 23: TAIL VISIVLE

The heart cells have begun to form, and almost as soon as they are forming they organize themselves into a heart muscle which beats independently. In a sense, behavior has appeared, but we don't recognize it was the real beginning of behavior because the heart is beating independently of any other part of the body. That is, no nerve cells are telling the heart when to beat.

The sex organs differentiate themselves

VIDEO:	AUDIO:
	so well that by the end of the sixty-day period boys can be distinguished from girls. By the time the embryo is six weeks of age, all parts of a reflex arc are present. That is, there is a nerve present in the spinal cord, traveling to the spinal cord; and there is one starting at the cord and leaving it, going to the various limbs. However, this reflex arc is not complete until eight weeks of age. In fact, electrical stimulation before eight weeks does not produce any reflexes. Slow movements of the arms and legs, such as those illustrated in the following slides, appear at six weeks but these may be due to the fluid movement in the uterus of the mother. ⬇⬇⬇ (PAUSE)
SLIDE 24: MOVEMENT ARMS SLIDE 25: MOVEMENT ARMS SLIDE 26: MOVEMENT LEGS	
	At eight weeks of age the embryo looks much like this. ⬇ (PAUSE 5 SECONDS)
SLIDE 27: DEVELOPMENT AT 8 WEEKS (5 SECONDS)	
	He has been observed to make worm-like movements of his whole body at this age. This suggests that the spinal cord nerves are working and

VIDEO:

AUDIO:

directing these whole body movements. Touch stimulation around his mouth will produce contractions of his body and neck muscles. All movement prior to eight weeks is thought to be possibly due to movements of the mother or movements of the uterine fluid. So, true behavior is believed not to exist in the embryo prior to eight weeks of age. By the end of this period then, this one-inch individual is distinctly human. All the important features, such as organs and glands of the body, have started to develop and the embryo represents a miniature human.

This period is as significant as the period of the ovum. For one thing, hazard is also present. Falls, emotional shocks, malnutrition, glandular disturbances, all can throw off the mother's ability to properly care for the embryo. For example, something could cause the embryo to dislodge or lose its grip on the uterine wall, thus resulting in miscarriage or spontaneous abortion. Various things can happen to cause the embryo to dislodge from the uterine wall; if the mother's progesteron is insufficient, the uterine walls could contract, causing the embryo to lose its

VIDEO:

AUDIO:

hold. Insufficient thyroid hormone, insufficiency of vitamin E, pronounced malnutrition or starvation as well as various diseases could cause difficulty. Pneumonia, small pox, diptheria, German measles, and diabetes can all be deadly to the developing embryo. For reasons yet unknown, female embryos have a better chance of survival than male embryos during this period. For every 100 females lost through miscarriage, for example, there are 160 males lost.

This period of the embryo is so important in the development of each separate arm and leg and organ of the body that if anything goes wrong, poor development of one of these organs could result. There seems to be a special time in the timetable of pre-natal development for the maturation of each organ. If something interferes, this organ will never be able to express itself fully, since its timetable has been thrown off. The disturbance does not seem to be so important as the timing of the disturbance itself. The disturbance may be internal, this is due to heredity from the beginning; or external, acting on the embryo from the outside. In humans it is known tha irradiation therapy, or X-rays; or the occurence of rubella; or German

VIDEO:	AUDIO:
	measles during the first few weeks of pregnancy could affect the developing embryo and cause deformities: a leg may not develop completely; the arms may not appear; the head or skull may not develop properly; the brain possibly may not develop and therefore cause mental retardation; the eyes may not mature properly because of rubella infecting the mother when the eyes are beginning to develop; or the hearing may be disturbed because of the mother catching German measles during this period. Any of these could cause disturbance in the normal development of the embryo.
PART III SUPER 3: PERIOD OF THE FETUS	The period of the fetus lasts from the end of the second month until birth. This is the longest period and in some ways is the least important. The new life has a long way to go before it can live separate from its mother, but the development which takes place in this period of the fetus consists mainly of changes in actual or relevant sizes of parts of the body that have already been previously established. At the end of the third month the fetus is 3½ inches long and weighs about 3/4 of an ounce. ⬇⬇⬇ (PAUSE FOR SLIDES)

VIDEO:	AUDIO:
(RAPIDLY) SLIDE 28: DEVELOPMENT AT 3 MONTHS SLIDE 29: DEVELOPMENT AT 3 MONTHS SLIDE 30: DEVELOPMENT AT 3 MONTHS	However, at birth he is about 19 inches long and weighs 7 to 7½ pounds, although there is a great variation from one individual to another. At the beginning of this period his head is 1/2 his total length, but at the end of the period his head is less than 1/4 of his total body length. This illustration, as compared with previous ones, clearly indicates the change in the proportion of his head to his body. ⬇ (PAUSE)
SLIDE 31: PROPORTION OF HEAD	During this period the organs are going to develop to the point that they can all operate together to produce an independent individual--one who can survive on his own. The sucking reflex is usually present at seven months and so is the ability to respond to warmth and cold. Brain, muscles, and organs follow a developmental pattern. Development proceeds

VIDEO:	AUDIO:
	from the head of the body to the toes; that is, muscles in the head area develop first and the muscles work themselves down until eventually those in the legs, ankles, feet, and toes develop. muscular and organ development starts maturing fastest at the center of the body, then it moves to the outside of the body. Thirdly, development is general then moves to very specific types of action patterns. Also, the order of development is constant within the species. The rate varies, however, so that from one individual to the other there is a great deal of difference in how fast development takes place.
	There are three types of fetal activity: first, there are slow squirming, stretching, pushing, and turning movements; secondly, quick kicks, jerks, and thrusts of the arms and legs, as demonstrated in the various positions of the hands in this series of photographs. ⬇⬇⬇
	(PAUSE FOR SLIDES)
(RAPIDLY) SLIDE 32: ACTIVITY OF THE FETUS SLIDE 33: ACTIVITY OF THE FETUS SLIDE 34: ACTIVITY OF THE FETUS	
	And thirdly, hiccups, or a series of quick

VIDEO:	AUDIO:
	convulsive movements. Kicking is the most common of these forms and hiccuping is the least common. In the last three months there is a significant increase in the total amount of movement. It has also been noted that those infants that are most active in the uterus are those that weigh the least at birth. This is believed to be due to the fact that the excess movement uses up the energy-producing food and so these foods are not stored as fat.
	Let's next take a look at sense organ development. The eyes, as you remember, begin developing as early as the second or third week. They have begun to move underneath the lids six months before birth. Slow, rhythmic movements take place as the eye is moved back and forth. When 5½ months old, the external development of the eyes looks much like that in this slide. ⬇
	(PAUSE FOR 5 SECONDS)
SLIDE 35: DEVELOPMENT OF EYES (5 SECONDS)	
	However, development is not complete until after birth. The infant may be able to perceive some light before nine months of age, nevertheless. The newborn infant is partially deaf until the Eustachian tubes open up and the fluid drains out of the tubes--then he can hear completely.

VIDEO:

AUDIO:

However, there is evidence that he can hear before birth in that he will show kicking movements inside the uterus when a loud sound is made in the vicinity of the mother. Taste and smell are developed by the seventh and eighth months although there is probably no taste or smell experience since the infant is in a constant uterine environment.

Touch also seems to operate very early in the fetal life. It seems to develop first in the head area, later in the shoulder and chest areas, then the stomach, legs, and very late, in the foot area. Thus, pinching the toes produces a slight movement of the foot as early as six or seven months. Pain stimulation seems to have little effect on prematurely born infants, showing that the pain sense is poorly developed during the pre-natal period. The temperature sense, however, is as well developed at seven months as it seems to be at nine months when the child is born. Reactions to stimuli warmer than the body are stronger than to simuli colder.

Let's now examine some of the factors which effect the health of the fetus during this last period prior to birth. Studies show

VIDEO:

AUDIO:

that parents from poor homes reflect their poor diet in their pregnancies. That is, more babies of the poor are stillborn; are premature; are functionally immature; and have congenital deficiencies.

Also, the mother's poor health can have its effect on the fetus. Tuberculosis, syphilis, toxic poisoning and endocrine disorders have been found to have the greatest effect in producing defects in the developing fetus. Heavy use of quinine water during malaria seasons produces congenital deafness. The Rh blood factor can produce mental retardation in the infant. Also, thyroid deficiencies can produce physically deformed or mentally retarded children. Slight exposure to X-ray during the later stages of pregnancy, however, seems to have little or no effect on the fetus. Alcohol itself is not known to have a direct effect on the fetus although excessive use of any drug by the mother is not beneficial to the unborn child. Heavy use of tobacco produces disturbances in the mother's blood pressure and about ten minutes after the mother starts to smoke a cigarette there is an increase in the fetal heart action. What long range effect this has

VIDEO:

AUDIO:

is not yet known.

Now that we have examined some of the physical factors that might effect the child's behavior and stature, let us look at some of the psychological factors.

We have evidence that the child can learn before birth. The fetal cerebral cortex, that part of the brain which is believed to give man his superiority over animals, is not functioning except to inhibit some of the lower reflexes. But the fetal brain must be able to store memories because the seven to eight month old fetus can be conditioned. The unborn baby shows gross body movements and kicks when a loud sound occurs near his mother. Spelt has shown that the fetus does not respond to a slight vibration to the mother's stomach. However, when Spelt applied vibration to many mothers' stomaches immediately prior to a loud sound a number of times (vibration-loud sound, vibration-loud sound, vibration-loud sound), the babies were conditioned to kick and move to the vibration itself. Thus, the unborn child can learn to give a response to a new stimulus.

Although most of the old wives' tales of the experiences of the mother affecting the

VIDEO:	AUDIO:
	unborn are superstitious and false, there is some evidence for the belief that her emotions during pregnancy may have an enduring effect on the child. Research with animals indicate that pregnant females scared many times during pregnancy give birth to young that are significantly more emotional as adults. Also, these highly emotional animals do not solve complex mazes as well as animals born to mothers who had non-emotional pregnancies. Thus, there are indications that the mother's experiences during pregnancy may effect the intellectual abilities of the newborn animal. It has also been found that human mothers who have severe emotional problems during pregnancy give birth to babies who are unstable in eating and sleeping cycles and who are hyperactive for months after birth. Thus, emotional strain to the pregnant mother may have long range effects on the personality of the infant.
PART IV	One of the greatest emotional strains applied to both mother and infant during pregnancy has been thought to be the birth process itself. Let's examine this process now. During birth, intense muscular contractions of the mother force the child out through the

VIDEO:	AUDIO:
MODEL 5	birth canal. Normally these rhythmic contractions force his head out first, followed by his shoulders, then his rump, and finally the attending physician is able to grasp his legs and the child has been born.
MODEL 4	The child's first introduction to this new life possibly is the slap he gets on the rump by the attending physician. Although the child's head, shoulders, and hips are squeezed and pushed through the canal, his well developed body and bone structure seem to be able to take the stress without harm. (PAUSE) Contrary to tradition, birth is not the great shock to the infant that one would suppose it to be. The skin sensitivities are not developed well enough to allow the infant to experience the pain which would otherwise result from the pressure of the intense muscular contractions necessary for him to be born.
	Because injury to the brain is likely to be the most lasting effect of a difficult birth, attempts have been made to see just how much, if any, change the birth process produces. Research in general seems to indicate that there is very little disturbance although in rare instances there actually has been some physical

VIDEO:	AUDIO:
	injury to nerves in the facial, neck, and head areas of the infant.
SUPER 10: RANK'S BIRTH TRAUMA THEORY	One of the ideas that resulted from the psychoanalytic theory suggested that the birth trauma produces enduring harm to the psychological health of the child. This theory was called Rank's Birth Trauma Theory. It stated that so much anxiety is created by the birth process itself that this anxiety is stored up to be released at various times throughout life as various stresses are placed on the individual. Although there was some early research suggesting that children who had had a great deal of stress applied to them during birth were more emotional than children who had easy births, most of the evidence today seems to indicate that the birth process itself does not lead to such enduring anxiety.
	Our travelog of prenatal development has followed the child from conception to birth. He has been living in a near perfect environment. All of his needs have been taken care of: food, water, oxygen, vitamins, waste has been taken from his body automatically, he has been gently moved about as the mother moved in her environment, a constant temperature has been maintained, and

VIDEO:	AUDIO:
	no stresses have been applied to him in most cases. This nine month period in a perfect environment then ends with the birth process. At the end of this birth process we have moved into the stage of the neonate, the next stage to be taken up. ⬇
SLIDE 36: NEWBORN CHILD	ANNCR:-The Center for Educational Technology University of Arkansas has presented CHILD PSYCHOLOGY, a program designed for the acoustically handicapped to provide for more effective communication through sign language, lip reading and demonstration. Dr. John N. Marr, psychologist, and Dr. Roy G. Parks, interpreter. Richard R. Shurtz is project director.

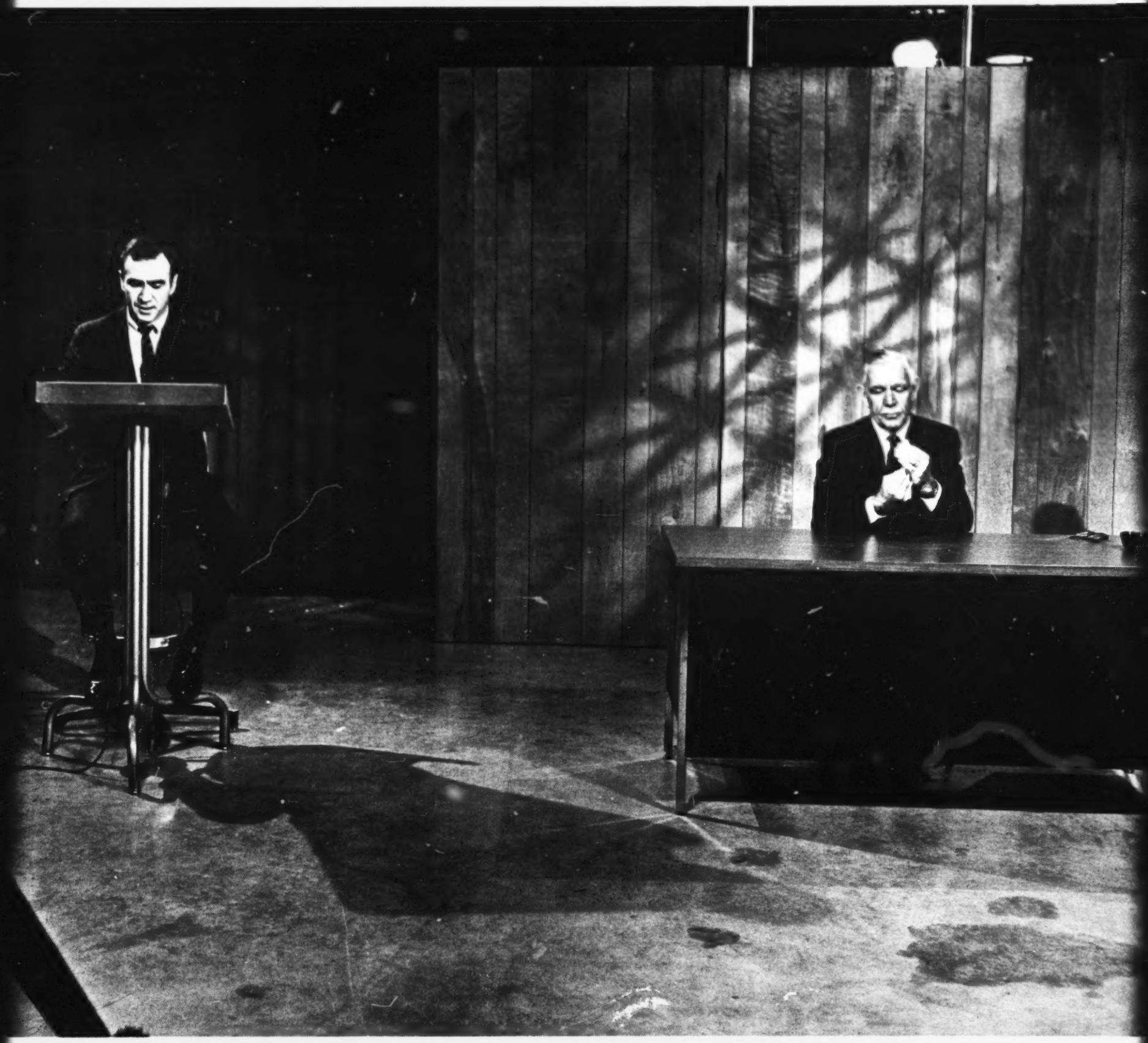
VIDEO - SUPERIMPOSURES

1. Period of the Ovum
2. Period of the Embryo
3. Period of the Fetus
4. Maturation
5. Ovulation
6. Fertilization
7. Ectoderm
8. Mesoderm
9. Endoderm
10. Rank's Birth Trauma Theory

VIDEO - SLIDES

1. Credits
2. Credits
3. Credits
4. Sperm
5. Fertilization
6. Division of cell
7. Division of cell
8. Division of cell
9. Division of cell
10. Arrangement of cells
11. Attachment to mother
12. Differentiation into organs
13. Differentiation into organs
14. Differentiation into organs
15. Differentiation into organs
16. Differentiation into organs
17. Four weeks of age
18. Neural groove
19. Development of limbs-4 weeks
20. Development-5 weeks
21. Development-5½ weeks
22. Development-6 weeks
23. Tail visible
24. Movement-arms
25. Movement-arms
26. Movement-legs
27. Development at 8 weeks
28. 3 months
29. 3 months
30. 3 months
31. Proportion of head
32. Activity
33. Activity
34. Activity
35. Development of eyes
36. Newborn child

APPENDIX D



BUREAU OF EDUCATION FOR THE HANDICAPPED
DIVISION OF RESEARCH

PROJECT NO: (FINAL REPORT) 6-8194

TITLE: A Study of the Feasibility of Using Television to Teach Child Psychology to the Acoustically Handicapped

AUTHOR: Richard R. Shurtz

INSTITUTION: University of Arkansas
Fayetteville, Arkansas

OE COORDINATOR: Max W. Mueller

RECOMMENDATION: Approval

SUMMARY OF REVIEWS

This final report has been reviewed by BEH staff, field readers and consultants. On the basis of these reviews we are recommending approval of this report and submission to ERIC. Criticisms of the report, however, indicate that further funding to this or a similar project would not be an economically or professionally sound action, as the value of the document was seriously questioned.

Consistency with Proposal:

Sample size and length of experimental program deviated from those proposed; however, the changes were justified and generally reflected acceptable research practices in dealing with the usual research problems. The proposed objectives were accomplished - but minimally.

Technical Soundness:

This area was criticized rather strongly - the objectives were accomplished, but the research was not thorough. Although the P.I. stated objectives were "to study the various television techniques ... applicable to the teaching of the acoustically handicapped ...", certain aspects of the film and final report indicated that the "study" had been superficial at best: e.g., why was the camera not at a forty-five degree angle to the speaker? - other research has indicated this is the best angle; captioning did not appear to be considered - was the P.I. unaware of the fact that many severely hearing - impaired past secondary students are not particulary adept at sign language and or lip - reading? (what about oral schools?); why was the relatively low verbal level of most deaf students not taken into account - objective c states that structuring.." a basis for intelligent selection of coures content..." is a major goal; in addition optimum use of available materials (visuals, etc.) was not made.

Adequacy of Reporting:

This aspect of the report received a low evaluation. The literature review was incomplete and the report appeared short of detail in many sections. One wonders if the reporting was in fact inadequate, or if there was nothing on which to report. Reviewers were of the opinion that the project director lost a great deal of enthusiasm for the project prior to termination.

Educational Significance:

This research appeared to indicate there was little value in this particular mode of attach. 50 percent comprehension on the part of an interpreter leads one to inquire about the comprehension level of the students. This report adds very little to what is already known about televised instruction to the deaf. In addition, one never does discover what is the feasibility of programming a television course for the deaf. However, the question, as studied, does not appear to be worth further research or funding.

Technical Quality:

The OE format for reports was not closely followed (pagination was improper and the title and cover pages were reversed); reproduction is fair. The typing and editing were very well done.